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SUMMARY

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FUNDAMENTAL FACTORS INFLUENCING THE BEHAVIOUR OF PAPER PRODUCTS UNDER EXTREME CLIMATIC CONDITIONS

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FUNDAMENTAL FACTORS INFLUENCING THE BEHAVIOUR OF PAPER PRODUCTS UNDER EXTREME CLIMATIC CONDITIONS

H.G. Higgins and A.J. Watson

The relationship between climate and economic development is briefly outlined with particular reference to the manufacture and use of paper. The extension of industry, hygiene, technology and science to the less developed areas presents new problems in this field, the solution of which will be difficult unless the fundamental knowledge available on the factors influencing paper properties is appreciated and applied. The way in which humidity affects the mechanical properties is discussed. The practical significance of dimensional stability is emphasized in relation to the phenomena of curl and cockling in paper, with some reference to the influence of fibre orientation. Conditions under which biological degradation of paper may take place are mentioned. The effects of temperature on degradation, particularly in association with low humidity, and the way in which changes in cellulose fibres depend on the presence of non-cellulosic constituents and on methods of pulping and bleaching are considered. Attention is drawn to factors which may restrict the use, under extreme climatic conditions, of packaging and wrapping materials, printing and writing paper, and photographic paper. Such properties as wet strength, moisture vapour permeability, dimensional changes, the presence of coatings and the radioactivity of pulp are significant in particular instances. The utilization of paper in regions with extreme climates may possibly be extended by conventional sizing and coating treatments, by chemical modifications to reduce the hydrophilic nature of the fibre, including grafting of polymers to cellulose, and by the wider application of plastic-coated papers. The nature of the raw materials may also be significant in determining the suitability for use under extreme conditions.

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